

(19) World Intellectual Property
Organization
International Bureau



10/538279 538279



(43) International Publication Date
1 July 2004 (01.07.2004)

PCT

(10) International Publication Number
WO 2004/055585 A1

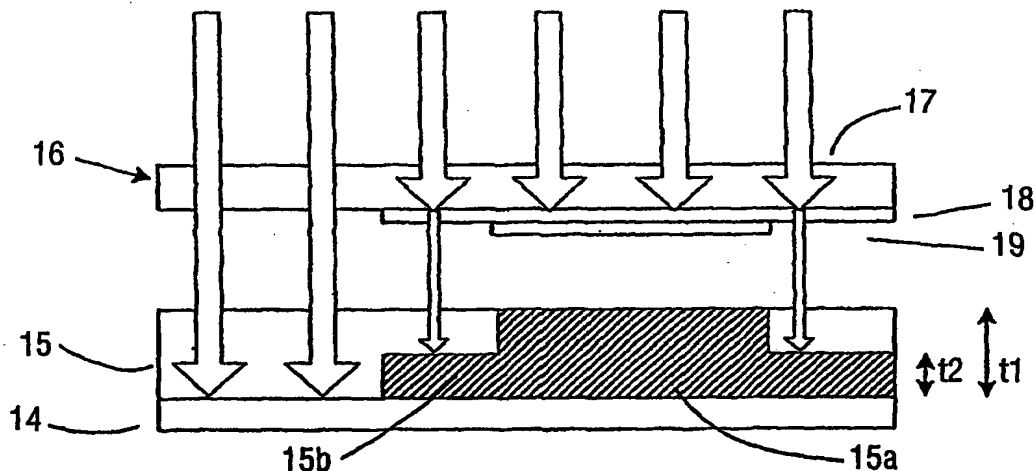
- (51) International Patent Classification⁷: G02F 1/1339, 1/1335, G03F 1/14
- (21) International Application Number: PCT/IB2003/005509
- (22) International Filing Date: 28 November 2003 (28.11.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0229226.6 14 December 2002 (14.12.2002) GB
- (71) Applicants (for all designated States except US): KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL). L.G. PHILIPS LCD CO. LTD. [KR/KR]; 20 Yoido-Dong, Youngdungpo-Ku, Seoul (KR).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): FRENCH, Ian, D. [GB/GB]; c/o Philips Intellectual Property & Standards, Cross Oak Lane, Redhill, Surrey RH1 5HA (GB). PARK, Sung-II [KR/KR]; c/o Philips Intellectual Property & Standards, Cross Oak Lane, Redhill, Surrey RH1 5HA (GB).
- (74) Agent: WILLIAMSON, Paul, L.; Philips Intellectual Property & Standards, Cross Oak Lane, Redhill, Surrey RH1 5HA (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE,

[Continued on next page]

(54) Title: LIQUID CRYSTAL DISPLAYS WITH POST SPACERS, AND THEIR MANUFACTURE



(57) Abstract: A post spacer (25) for a liquid crystal cell (26) is formed using colour filter material. At least a portion (15a) of the post spacer (25) and a corresponding pixel colour filter (15b) are defined from a layer of colour filter material (15) using photolithography, in which a photomask (8) comprising a pattern of transparent, half-tone and opaque regions is used to define structures with two different thicknesses t_1 , t_2 simultaneously. The use of a half-tone photomask (8) allows the thickness of the post spacer portion (15a), and, therefore, the eventual height of the post spacer (25), to be defined independently of the thickness of the colour filter (15b). The post spacer (25) may be formed using half-tone photomasks (8) to define more than one layer of colour filter material (15, 23), allowing the ratio t_1/t_2 to remain within a predetermined limit. The post spacers (25) are preferably located away from thin film transistors (TFTs) (31) and at intersections of row and column electrodes (32, 33).